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Severe Headache following the Administration of Local Anaesthesia in a Patient with a History of Traumatic Brain Injury – A case report.

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Abstract

Introduction

Complications associated with the administration of local anaesthesia are rare, with the majority being local or self-limiting.

Case report

A single case where severe unilateral headache associated with left sided inferior alveolar nerve block injection is reported. A history of a traumatic brain injury on the ipsilateral side was a potential factor

The strategy used to produce local anaesthesia without a recurrence of the headache is described.

Conclusion

A logical approach to the history taking and treatment planning resulted in a successful outcome for the patient using commonly practiced local anaesthetic techniques

Introduction

The administration of local anaesthesia for dentistry is one of the most commonly performed procedures in the world. The use of local anaesthesia in dentistry has an exemplary safety record with complications associated with its administration being rare. The majority of the described complications produce local effects and are fully described in the textbooks on the subject^{1,2}, and therefore will not be discussed here.

The most common systemic complication of local anaesthesia in dentistry is the inadvertent intravascular injection of local anaesthetic agents. The second most common is fainting around the time of local anaesthetic administration. Other systemic events are extremely rare, to the point that most practicing dentists will not see them during their practising lifetime. The diagnosis, management and prevention of all systemic complications are fully detailed in the available texts^{1,2}.

The correct diagnosis and management of unusual reactions to local anaesthesia is an important part of the patient management. The author has received referrals of patients who have inappropriately been told that they must not have local anaesthetics administered ever again, usually as a result of the clinician panicking at a reaction they have not experienced and do not understand.

The implication of stating to a patient that they must not or cannot have local anaesthetics administered in the future is that a general anaesthetic will be required for all painful procedures that the patient cannot tolerate without pharmacological assistance. This places a huge unnecessary financial burden on those funding the healthcare of the patient as well as exposing the patient unnecessarily to the increased risk of unnecessary general anaesthesia.

This report details the problems that one particular patient experienced whilst attempting to have dental treatment under local anaesthesia and the management strategy that led to a successful treatment outcome.

Case Report

Patient JF, who was a 60-year-old lady at the time of treatment, was referred to Bristol Dental Hospital by her General Dental Practitioner. The patient had attended for an examination and then subsequently for the restoration of a carious cavity in the lower left second molar.

The referral indicated that a left side inferior alveolar nerve block injection had been administered. Lidocaine had been used. The author believes that this was with 1:80 000 epinephrine although this was not stated in the referral letter. The referring GDP indicated that there was a negative aspiration.

Approximately 1 minute after the administration, the patient started to complain of severe pain on the left-hand side of her head such that the restoration could not be completed. The patient was neither dizzy nor unwell in any other way. The patient reported no other migrainous or autonomic symptoms.

During consultation at the Dental Hospital, the patient gave the following history. At the age of 18 years she had been involved in a motor cycle accident which had resulted in her being unconscious for 3 days. In the aftermath of the accident, she suffered from recurrent left sided headaches, which were untreated until the age of 36 years.

As a result of a significant episode of pain when aged 36 years, the patient consulted a General Medical Practitioner who prescribed propranolol. This medication was successful in managing the headaches for approximately 14 years, until they recurred at the age of approximately 50.

The patient underwent a CT scan which showed significant brain damage on the left-hand side. The patient subsequently underwent an MRI scan approximately 3 years later and the results were consistent with the CT scan. The MRI showed an area of atrophy in the left frontotemporal region in keeping with the injury described. There was also some evidence of sinus disease. Despite the findings of these investigations that patient had no functional impairment and was able to live a full and active life.

The patient had undergone routine restorative care up to the age of 50 years with no issues. The dentition was moderately heavily restored, with restorations present in the majority of standing molar and premolar teeth, as shown in the OPT radiograph (Figure 1).

When the patient was aged 50 she attended for restorative treatment of a tooth in the lower left quadrant of her mouth. An inferior alveolar nerve block injection was administered on the left-hand side. Immediately after the local anaesthetic injection had been completed, the patient reported an intense pain on the left-hand side which started in her jaw and spread up to the left-hand side of her head. The pain lasted for 2 days. The patient reported that on the third day, once the pain had subsided, her chin felt numb. Despite frequent consultations with a General Medical Practitioner and a range of treatments, the recurrent headaches have been a feature of the patient's daily life for the 11 years between that treatment episode and her referral to Bristol Dental Hospital. At the time of referral the patient was taking: -

Sodium Valporate

Naproxin

Pindolol
Omeprazole.

History of current course of treatment

The patient had attended her General Dental Practitioner in May 2016 for restoration of the lower left second molar tooth which was diagnosed with mesial secondary caries under the existing restoration (as seen in the bitewing radiograph (figure 2). When the patient attended for treatment an inferior alveolar nerve block injection was administered on the left-hand side with a 2% solution of lidocaine with epinephrine. There was a negative aspiration prior to the deposition of the local anaesthetic. Approximately one minute after the local anaesthetic injection was completed, the patient started to complain of severe left sided headache, which the patient described as being the same as had occurred 10 years previously. As with the previous experience, the headache lasted for approximately 2 days after the treatment and was resistant to analgesia.

In the intervening 10 year the patient had received dental treatment in other areas of her mouth, with no problems. This had included the administration of local anaesthesia, although the patient was uncertain as to whether this had included a right sided inferior alveolar nerve block. She believed that she had received conservative dental treatment to the lower right, and felt it was likely that local anaesthesia had been administered in that area. She was however certain that there had been no treatment in the lower left quadrant during that intervening 10 years.

The patient had been thoroughly investigated by both her General Medical Practitioner and a Consultant Neurologist without a definitive diagnosis being reached. When JF attended Bristol Dental Hospital, she was anxious at the thought of receiving local anaesthesia in the lower left quadrant. She described the pain of the headaches associated with the last two administrations of local anaesthesia as extremely severe and that she was terrified of it happening again, and thus wished to avoid having local anaesthetic solution administered in that area again.

Radiographic examination confirmed the presence of secondary caries in the lower left second molar tooth (figure 2). An OPG radiograph confirmed that the mandibular foramen was in a normal position with respect to height and its antero-posterior position on the Ramus of the mandible (Figure 1).

A search of the literature failed to find any similar reports. The author contacted a number of internationally renowned experts in local anaesthesia, none of whom were able to provide an explanation for the headache post left sided inferior alveolar nerve block

A treatment plan was derived to restore the lower left second molar under local anaesthesia using a buccal infiltration of 4% articaine with 1:100 000 epinephrine followed by periodontal ligament anaesthesia with the same local anaesthetic solution.

Treatment appointment

The patient attended for treatment approximately 6 weeks after the initial consultation. This interval between appointments allowed the literature search and dialogue between clinicians to take place.

When she attended JF was not having any symptoms associated with the lower left second molar tooth.

In the intervening period, the patient had started taking gabapentin in a further attempt to control the headaches, but with little success.

The patient was extremely anxious regarding the administration of local anaesthesia. She reported having visited her dentist in the interim and that her dentist advised her that there was a nerve running in that area up into her brain that was probably the cause of the problem. This "advice" hindered the appointment and made the patient much more anxious than she had previously been.

Once reassured the medical and dental history had been checked, topical anaesthetic (20% Benzocaine gel) was applied over the site of the infiltration. 2ml of 4% articaine with 1:100 000 epinephrine was administered over 1 minute. Two minutes later periodontal ligament anaesthesia was administered using a conventional syringe in 2 divided doses totalling 0.75 ml. The dose was divided between the distal and mesial roots of the tooth.

The patient reported no discomfort associated with the administration of the local anaesthetic nor any headache after the administration.

The existing amalgam restoration was removed with a highspeed diamond bur, and the secondary caries with a large rosehead bur in a slow speed handpiece.

The tooth was restored with an amalgam restoration.

The patient reported no discomfort during the procedure.

The patient was discharged approximately 45 minutes after the administration of the local anaesthetic, feeling fit and well. JF expressed her relief that the procedure had gone uneventfully and that a strategy for obtaining anaesthesia in that quadrant had been proved successful.

The patient was discharged to her General Dental Practitioner for her ongoing care, with the recommendation that the same approach to local anaesthesia is used for any future treatment in the lower left quadrant to avoid future nerve blocks in that area.

Discussion

Patients who present with problems associated with receiving local anaesthetic injections present the dental profession with a significant dilemma. It is important in the light of the recommendations of the Department of Health in 2000³ that general anaesthesia is reserved for where it is clinically indicated. Particularly in dentistry it is important to avoid patients becoming dependent on general anaesthesia, as ongoing care over a lifetime could result in patients receiving multiple, avoidable, general anaesthetics.

The fundamental basis for diagnosis and treatment planning is a thorough and careful history and examination. In this case the absence of problems associated with receiving local anaesthetic injections in other areas of the mouth meant that it was possible to rule out a systemic reaction to the local anaesthetic solution, as well as a psychogenic reaction as these tend to be associated with administration in all areas of the mouth.

Perusal of two texts on local anaesthesia^{1,2} failed to find any mention of headache as a complication of local anaesthetic administration. In a paper reporting a multinational trial of articaine reported that both articaine and lidocaine administration was associated with headache in 4 and 3% of the sample respectively⁴. No explanation for the cause of post local anaesthetic head ache was given in that paper.

In the present case, the severity of the reported headache was markedly different from what the author would have expected as the "normal complication headache". The report was of a severe persistent effect that would be considered a moderately severe complication.

The term Trigeminal Autonomic Cephalalgias is used to cover a group of moderate to severe headache disorders characterised by attacks of moderate to severe unilateral pain in the head and face, with associated ipsilateral autonomic features.⁵ These conditions were reviewed by Cohen in 2014⁵. The presentation in this case does not fit the pattern of any of the variants described in this review.

Whilst the aetiology remains unknown, the application of a logical diagnostic process and using the full range of local anaesthetic injections at our disposal has resulted in a positive outcome for this patient.

In many such cases referrals are received requesting treatment under intravenous sedation. Such requests lead to the author having to spend significant amounts of time explaining the difference between anxiolysis and analgesia to patients who are expecting that the sedation will lead to pain free dentistry.

Conclusion

It is important to adopt a systemic approach to the history taking and treatment planning for patients who present with problems associated with receiving local anaesthesia to avoid unnecessary or inappropriate use of conscious sedation or general anaesthesia. It is also important that members of the profession avoid giving incorrect advice to patients, as this can make the management of patients on referral more difficult as the recipient of the referral must deal with the misinformation as well as the clinical problem.

The patient described here is an example of how such a logical approach resulted in effective patient management.

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Legends for figures

Figure 1. OPT radiograph taken at consultation appointment. Patient aged 60 years

Figure 2. Left bitewing radiograph taken at consultation appointment. Patient aged 60 years